LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
T. Carroll	4-5-08	4-8-08	N2120581.324 / E5994178.193 (NAD83)	BTNB-R5-PZ-D
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Gregg Drilling and Testing, Inc.			Offset 154ft R Sta 85+5 NB Alignment	79.635 ft (NAVD88)
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Mud Rotary			Fraste Multi-drill (track)	5 in. (soil); 4 in. (rock)
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core			Automatic, 140 lbs., 30-inch drop	72.9%
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
2" dia. Standpipe Piezo Screened 78.0 to 98.0 ft				114 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	Description	Sample Location	Sample Number	Blows per 6 In	Blows per Foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0		1/2" ASPHALT CONCRETE.												
	1		SEDIMENTARY ROCK (SANDSTONE), fine, dark gray, intensely weathered, moderately soft, intensely fractured, with yellowish brown CLAY infilling. [BEDROCK]												
77.64	2														
	3				S1		50/3"	78							
75.64	4		SEDIMENTARY ROCK (SANDSTONE), medium grained to fine grained, no indication of bedding, dark grayish brown, moderately weathered, moderately hard, moderately fractured, heavy iron-oxide staining on fracture surfaces, light staining within rock mass at 4.5', vein infilling up to 0.02' thick (calcite?), grades very thinly bedded, intensely fractured, fracture dipping ranges from 20° to 70°, fractures are typically intensely weathered. Grains are angular to subangular, uniform, numerous insipient fractures, very dense/lithified.		C2			80	13						
	5														
73.64	6														
	7		6.8', finer grained with decrease in medium grained, darker minerals, moderately to slightly weathered.		C3			100	0						
71.64	8														
	9				C4			100	15						
69.64	10		10.01', clayey sand sheared filling, entire interval appears massive (no indication of bedding).												
	11														
67.64	12		12.0', fracture orientation and spacings remain consistent with above.		C5			92	0						
	13														
65.64	14														
	15				C6			95	10						
63.64	16		15.9', seam infilling with clay.												
	17		16.5', slickensides parallel to dip.												
61.64	18		~17.9' to 19.0", near vertical fracture, undulating surface intersecting fractures average orientation is 345/81E.												
	19		19.0', slightly weathered (slight iron-oxide staining).		C7			78	0						
59.64	20														
	21		21.0', very intensely to intensely fractured with one length from 21.5' to 22.0' intact.		C8			75	25						
57.64	22														
	23		23.0', hard, fresh to slightly weathered (absence of iron-oxide stains).		C9			47	0						Hole taking a little fluid at 23'
55.64	24		23.0', multiple vertical fractures entire length of core with additional sub-horizontal fractures.												
	25														

(continued)

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BORING RECORD				BTNB-R5-PZ-D
DIST.	COUNTY	ROUTE	POSTMILE	EA
4	S.F.	101	8.3/9.4	163701
PROJECT OR BRIDGE NAME				
Doyle Drive Replacement Project				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
34-0161R	T. Carroll		11-3-08	1 of 4

CALTRANS FORMAT DOYLEDRIVE_ARUPLOGS_11-2-08.GPJ ARUP LIBRARY_CALTRANS FORMAT.GLB 11/3/08

Figure

ELEVATION (ft)	DEPTH (ft)	Material Graphics	Description	Sample Location	Sample Number	Blows per 6 In	Blows per Foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	25		23.4', white mineral, vein, hard (non-quartz). 23.6', CLAY seam infilling.												
53.64	26		SEDIMENTARY ROCK (SANDSTONE), medium grained to fine grained, no indication of bedding, dark grayish brown, moderately weathered, moderately hard, moderately fractured, heavy iron-oxide staining on fracture surfaces, light staining within rock mass at 4.5', vein infilling up to 0.02' thick		C10			100	0						
	27														
51.64	28		(calcite?), grades very thinly bedded, intensely fractured, fracture dipping ranges from 20° to 70°, fractures are typically intensely weathered. Grains are angular to subangular, uniform, numerous insipient fractures, very dense/lithified.		C11			100	24						
	29														
49.64	30		27.0' - 28.0', white mineral vein fillings (unrelated to fracturing) pervasively fractured (from fragments to 0.2').												
	31		28.0', intensely fractured, fractures dipping commonly 60° to 70°, continued localized white mineral vein fillings. 30.9', 0.08' thick shear zone (light gray, silty, fine sand).		C12			80	37						
47.64	32		31.0', contact to fine grained SAND (medium grained above).												Lost circulation 31.5' to 32.5'
	33														Taking a little water at 33'
45.64	34		33.4', fine to medium grained (core broken with silty fine SAND fragments <0.01' to 0.2').												Apparent bedding caused by coring (typical 31.9' to 32.2)
	35				C13			48	0						
43.64	36														
	37		36.4', very intensely fractured (crushed) (silty, fine SAND shear zone).												
41.64	38		38.0', 0.3' intact fragment (laminated showing soft sediment deformation), no visible sand grains.		C14			65	0						
	39		38.3', 0.05' quartz vein.												
39.64	40		SEDIMENTARY ROCK (MELANGE MATRIX), dark gray (consisting of fine grained SANDSTONE, very hard SILTSTONE, and fragmented hard SHALE), very intensely fractured (crushed), slightly weathered to fresh.												40' to 41', straight drill At 40' rock contact gradual based on drilling change Recovery is broken fragments of core, not representative of zone.
	41				C15			25	0						
37.64	42														
	43				C16			40	0						
35.64	44														Straight drill 44' to 45'
	45				C17			1	N/A						
33.64	46														
	47		Very soft to hard.		C18			73	N/A						
31.64	48														
	49		48.5', fresh, fragments are fine grained, lithic SANDSTONE, occasional quartz? veins, fragments range from <0.01' to core diameter.		C19			100	N/A						Switch to 101 sampler at 48.5'
29.64	50		50.0' - 51.1', crushed, very fine grained.		C20			97	N/A						
	51		51.1' - 52.1', clayey (primarily clay with hard fragments).												
27.64	52		52.1' - 52.4', crushed, very fine grained. 52.4' - 52.9', clayey.												
	53		Scattered green mineral filling within small cavities (up to 0.08" diameter)(chlorite?).		C21			100	N/A						
25.64	54		53.0', highly sheared shale with internal slickensided shear planes within rock mass and very fine grained sandstone fragments.												
	55														

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Figure

ELEVATION (ft)	DEPTH (ft)	Material Graphics	Description	Sample Location	Sample Number	Blows per 6 In	Blows per Foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	55		SEDIMENTARY ROCK (MELANGE MATRIX), dark gray (consisting of fine grained SANDSTONE, very hard SILTSTONE, and fragmented hard SHALE), very intensely fractured (crushed), slightly weathered to fresh.												
23.64	56														
	57		56.5', less clayey (more intact shale).		C22			100	N/A						
			56.8' and 60.4', 0.15' hard resistant rock fragments, core breaks are irregular sub-horizontal to 10°dip.												
21.64	58														
	59		59.2', crushed/sheared zone without clay.												
19.64	60		Iron-oxide staining common on fracture faces, moderately weathered.												
	61				C23			28	N/A						
17.64	62														
	63														
15.64	64														
	65		64.5', very minor local staining on surfaces (chlorite?), iron-oxide staining throughout, primarily sheared fragments with sub-horizontal fissillity.		C24			100							
13.64	66		65.5', interval ranges from pervasively sheared shale (clayey) to hard gray sandstone fragments (up to 0.25').		C25			70	N/A						
	67		65.75', dipping 35°.												
11.64	68		67.5', continued highly sheared shale.		C26			28	N/A						
			67.5' - 68.2', scattered quartz vein filling.												
	69		68.2', subangular sandstone fragments (up to 0.05') in olive brown clay matrix.												
9.64	70														
	71														
7.64	72				C27			72	N/A						
	73	• •	SEDIMENTARY ROCK (SANDSTONE), fine grained, hard, very intensely fractured, moderately weathered with heavy iron-oxide staining on fracture surfaces and extending slightly into the rock mass.												
5.64	74	• •	72.5', iron-oxide staining on some surfaces, but not all, suggesting mechanical breaks.		C28			100	O						
	75	• •	74.0', continued mechanical breaks, multiple fracture orientations, quartz vein (20° dip) at 74.7' (0.02' thick).		C29			100	0						
3.64	76	• •	75.7', horizontal to 10° fractures, clay filled sheared fracture at 76.3'.		C30			75	0						
	77		SEDIMENTARY ROCK (MELANGE MATRIX), dark gray, fresh, very soft.		C31			14	0						Contact based on drilling change.
1.64	78														
	79														
-0.36	80				C32			100	N/A						
	81		81.1', chlorite? vein (1/4" thick).												
-2.37	82		81.6', quartz vein (1/4" thick), sheared shale with hard sandstone pieces (up to 1/4"diameter).		C33			100	N/A						
	83	• •	SEDIMENTARY ROCK (SANDSTONE), dark gray, fine grained, moderately hard, very intensely fractured, fresh, not clayey.		C34			80	N/A						
-4.37	84	• •	82.3' - 82.6', crushed zone.												
	85	• •													84.5' to 85', straight drill

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Figure

ELEVATION (ft)	DEPTH (ft)	Material Graphics	Description	Sample Location	Sample Number	Blows per 6 In	Blows per Foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	85		SEDIMENTARY ROCK (MELANGE MATRIX), dark gray, slightly weathered to fresh, soft, very intensely fractured (crushed), mylonized (CLAY-like) with subangular sandstone fragments, variably oriented contacts dipping up to 30°. SANDSTONE fragments up to 0.2' thick localized shearing along thin fractures.		C35			93	1.5/4'						Switch to HQ core barrel at 85'
-6.36	86														
	87														
-8.36	88		METAMORPHIC ROCK (META-SANDSTONE), steeply dipping, laminated relic bedding offset by healed micro-faults, dark gray, fresh, hard, moderately to slightly fractured, milky white vein filling.												
	89				C36			98	1.6						
-10.37	90		89.0', clayey infilling common, very intensely fractured (crushed), random quartzitic vein filling, locally associated with fractures and planes of weakness, harder pieces within mylonized zone are moderately hard overall matrixes soft.												
	91		89.6' - 91.0', fractured mylonized zones. 91.0', hard, moderately fractured.												
-12.37	92		92.0', mylonized seam (0.02' thick).												
	93														
-14.37	94				C37			100	0						
	95		94.4', intensely to moderately fractured, mylonized zone. 95.0, crushed zone.												
-16.37	96														
	97		96.4', mylonized clay zone with quartz vein filling.												
-18.37	98														
	99				C38			100	62						
-20.37	100		99.0', continued quartz vein filling, parallel and not parallel to fractures, moderately fractured.												
	101														
-22.37	102														
	103														
-24.37	104		103.2', sheared/mylonized, dark gray and yellowish brown, iron-oxide staining throughout fractures, very intensely fractured (crushed), slickensides of fractures at 103.2' parallel to dip.		C39			72	N/A						At 104', fluid color change from light gray to yellow brown
	105		104.0', pervasively fractured, mylonized, with pervasive secondary clay formation, remanant intersecting fracture planes at 30° to 40° dip, moderately weathered.												
-26.37	106														
	107		106.5', predominantly moderately hard, intensely weathered, clay smearing and iron-oxide staining on fractures at 109.0'. 106.5' - 106.9' and 108.5' and 108.8', clayey mylonized zones (with subangular sandstone fragments in clay matrix).		C40			100	0						
-28.37	108		108.3' - 109.5', additional sub-vertical fractures.												
	109		109.0', gray clay along predominant fracture. Quartz? veins continued, primarily unrelated to fracures. Multiple fracture sets primarily between 50° - 30°.												
-30.37	110				C41			90	0						
	111		110.7' - 102.2', pervasively sheared with a substantial portion mylonized, random fracture orientations.												
-32.37	112														
	113		112.5', pervasively oxidized, intensely fractured, variably oriented fractures.		C42			100	O						
-34.37	114				C43			0	0						
	115		Borehole terminated at a depth of 114 feet on 4/8/2008. See Boring Record Legend for soil classification chart and key to test data and sampler type.												

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Figure